Claims

Please amend the claims as follows:

1. (Original) A system for receiving a signal, comprising:

an antenna adapted to receive a signal, the signal being decomposable into first and second CDMA signal segments attributable to first and second emitters, respectively; and

projecting means for determining the first CDMA signal segment, the first CDMA signal segment spanning a first signal space, the projecting means being in communication with the antenna and determining the first CDMA signal segment by projecting a signal space spanned by the signal onto the first signal space, wherein the first signal space is orthogonal to a space that corresponds to an interference code matrix for the second CDMA signal segment.

2. (Currently Amended) The system of claim 1, wherein the signal space is obliquely projected onto the first signal space along a second signal space spanned by the second CDMA signal segment.

3. (Original) The system of Claim 1, wherein the system includes:

a) a plurality of antennas, each of which receives at least a portion of the signal, and

b) a plurality of projecting means corresponding with the plurality of antennas and being in communication therewith, each of the plurality of projecting means being adapted to determine by projection the first CDMA signal segment of the respective signal portion received by the corresponding antenna.

4. (Currently Amended) The system of claim 3, further comprising a plurality of RAKE processors corresponding with the plurality of projecting means, wherein each of the plurality of projecting means produces a respective projecting means output which is received as a RAKE processor input by a RAKE processor corresponding to each of the plurality of projecting ~~means'~~ means ~~corresponding RAKE processor~~, the respective output of each of the plurality of projecting means being delayed relative to one another, each of the plurality of RAKE processors being adapted to align and scale its respective input to produce a compensated output.

5. (Original) The system of Claim 4, wherein the compensated output of each of the plurality of RAKE processors is delivered to a summing correlator.

6. (Original) The system of claim 1, further including a RAKE processor having a RAKE input, wherein the projecting means produces a projecting means output which is coupled to the RAKE input.

7. (Original) The system of Claim 1, wherein the first CDMA signal segment comprises

a plurality of multipath signal segments and the projecting means outputs a correlation function having a plurality of peaks corresponding to the plurality of multipath signal segments, and further comprising:

threshold detecting means, in communication with the projecting means, for generating timing information defining a temporal relationship among the plurality of peaks.

8. (Original) The system of Claim 7, wherein the system comprises a plurality of projecting means and a plurality of antennas in communication with a corresponding threshold detecting means and further comprising:

timing reconciliation means for determining a reference time based on timing information received from each of the threshold detecting means.

9. (Currently Amended) The system of Claim 8, further comprising:

a RAKE processing means, in communication with each of the projecting means and the timing reconciliation means, for aligning the plurality of multipath signal segments in at least one of time and phase as a function of at least one of the magnitudes of the plurality of multipath signal segments, the reference time, and the phase, the ~~phased~~ RAKE processing means outputting an aligned first signal.

10. (Original) The system of Claim 9, further comprising:

a plurality of RAKE processing means, each RAKE processing means being in communication with a corresponding one of the plurality of antennas and producing a corresponding aligned first signal attributable to the first emitter; and

a demodulating means, in communication with the plurality of RAKE processing means, for demodulating at least a portion of each corresponding aligned first signal, the at least a portion of each corresponding aligned first signal defining a respective aligned first space, the demodulating means determining the respective corresponding aligned first signals by obliquely projecting a respective signal space defined by a corresponding aligned first signal onto the respective aligned first space.

11. (Previously Presented) A system for receiving a signal, comprising:

an antenna adapted to receive a signal and adapted to generate an output signal, the output signal being decomposable into:

(i) a first CDMA signal portion attributable to a first source, and

(ii) at least one second CDMA signal portion, the at least one second CDMA signal portion being attributable to at least one second source; and,

a projection filter in communication with the antenna for determining the first CDMA signal portion of the output signal, the projection filter being in communication with the antenna and determining the first CDMA signal portion of the output signal by projecting a signal space spanned by the output signal onto a first signal space that corresponds to the first CDMA signal portion, wherein the first signal space is orthogonal to an interference space that corresponds to one or more interference code matrixes corresponding to the at least one second CDMA signal portion.

12. (Original) The system of Claim 11, wherein the output signal includes a noise portion and the antenna includes a receiver and at least a portion of the noise portion is generated by the receiver.

13. (Currently Amended) The system of Claim 12, further comprising a projection builder operable to determine a projection operator corresponding to the first ~~CMA~~ CDMA signal portion by the following equation:

$$(y^T(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)y)/\sigma^2$$

wherein y corresponds to the output signal, H is related to an interference code matrix of the first source, S is related to an interference code matrix of at least a second source, ^{T} denotes the

transpose operation, I denotes the identity matrix, and σ^2 corresponds to the variance of the magnitude of the noise portion.

14. (Previously Presented) The system of Claim 12, further including a plurality of projection filters corresponding to a plurality of antennas and being in communication therewith, each of the plurality of projection filters being adapted to determine a respective first CDMA signal portion of a corresponding portion of the signal received by each of the plurality of antennas and determine the respective first CDMA signal portion of the signal using the equation of Claim 13.

15. (Previously Presented) The system of Claim 14, further including a plurality of RAKE processors in communication with a corresponding one of the plurality of projection filters, wherein each of the plurality of projection filters produces a corresponding projection filter output which is received as a RAKE processor input by its corresponding RAKE processor, the corresponding projection filter output of each of the plurality of projection filters being delayed relative to one another, each of the plurality of RAKE processors being adapted to align and scale their respective inputs to produce a corresponding compensated output.

16. (Previously Presented) The system of Claim 15, wherein the corresponding compensated output of each of the plurality of RAKE processors is delivered to a second projection filter in communication therewith for determining a refined first CDMA signal portion of each of the compensated outputs.

17. (Previously Presented) The system of Claim 12, wherein the first CDMA signal portion comprises a plurality of multipath signal segments and the projection filter outputs a correlation function having a plurality of peaks corresponding to the plurality of multipath signal segments, and further comprising:

a threshold detector, in communication with the projection filter, for generating timing information defining a temporal relationship among the plurality of peaks.

18. (Original) The system of claim 17, wherein the system comprises a plurality of antennas in communication with a corresponding threshold detector and further comprising: a timing

reconciliation device for determining a reference time based on timing information received from each of the threshold detectors.

19. (Previously Presented) The system of Claim 18, further comprising:

one or more RAKE processors, in communication with the projection filters and the timing reconciliation device, for aligning the plurality of multipath signal segments in at least one of time and phase based on the magnitudes of the plurality of multipath signal segments and the reference time to form an aligned first CDMA signal.

20. (Original) A method for processing a composite signal, the method comprising the steps of:

(a) providing a composite signal that is decomposable into a first CDMA signal portion that is attributable to a first emitter and at least one second CDMA signal that is attributable to a second emitter; and

(b) obliquely projecting a signal space corresponding to the composite signal onto a first signal space corresponding to the first CDMA signal portion to determine a parameter of the first CDMA signal portion, wherein the first signal space is orthogonal to an interference space that corresponds to an interference code matrix corresponding to the second emitter.

21. (Original) The method of Claim 20, wherein the signal space is obliquely projected onto the first signal space along a space that is at least substantially parallel to the interference space.

22. (Original) The method of Claim 20, wherein the projecting step determines the magnitude of the first CDMA signal portion and wherein the first and second CDMA signal portions are transmitted asynchronously.

23. (Original) The method of Claim 20, wherein the first CDMA signal portion comprises a plurality of multipath signal segments and further comprising:

aligning at least one of a received time and phase of the multipath signal segments to produce an aligned first signal.

24. (Original) The method of Claim 23, further comprising:

scaling the multipath signal segments.

25. (Original) The method of Claim 20, wherein the first CDMA signal portion comprises a plurality of multipath signal segments, each of the plurality of multipath signal segments being received at different times, and further comprising:

assigning to a portion of each of the plurality of multipath signal segments a respective time of receipt.

26. (Original) The method of Claim 25, further comprising:

determining a reference time of receipt based on the respective times of receipt.

27. (Currently Amended) The method of Claim 25, further comprising:

correlating the plurality of multipath signal segments without regard to the differing times of receipt to form a summated peak magnitude;

aligning the plurality of multipath signal segments relative to the reference time of receipt to form a plurality of aligned signals;

scaling each of the multipath signal segments to form a plurality of scaled signals; and

~~third~~ summing ~~at least one of the aligned signals and~~ the scaled signals.

28. (Original) The method of Claim 22, further comprising:

determining an actual time of transmission of the first CDMA signal portion;

determining an actual received time for the first CDMA signal portion; and

repeating step (b) using an actual time of transmission of the first CDMA signal portion and the actual received time.

29. (Previously Presented) The method of Claim 20, further comprising the step of generating at least one projection operator according to the equation:

$$(y^T(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)y)/\sigma^2$$

where y corresponds to the composite signal, H is related to an interference code

matrix of the first emitter, S is related to an interference code matrix of at least a second emitter, ^{T} denotes the transpose operation, I denotes the identity matrix and σ^2 corresponds to the variance of the magnitude of a noise portion of the composite signal.

30. (Original) A method for decomposing a composite signal having first and second CDMA signal segments attributable to first and second emitters, respectively comprising:

projecting a signal space spanned by the composite signal onto a first signal space spanned by the first CDMA signal segment to determine a parameter of the first CDMA signal segment, wherein the first signal space is orthogonal to an interference space that corresponds to an interference code matrix associated with the second CDMA signal segment; and

processing the parameter.

31. (Original) The method of Claim 30, wherein, in the projecting step, the signal space is obliquely projected onto the first signal space along the interference space.

32. (Original) The method of Claim 30, wherein the composite signal includes a second CDMA signal segment attributable to a second emitter other than the first emitter and wherein the first and second CDMA signal segments are transmitted asynchronously.

33. (Original) The method of Claim 30, wherein the first CDMA signal segment comprises a plurality of multipath signal segments and further comprising:

aligning at least one of a received time and phase of the multipath signal segments to produce an aligned first signal.

34. (Original) The method of Claim 33, further comprising:

scaling the multipath signal segments.

35. (Original) The method of Claim 33, wherein the first CDMA signal segment comprises a plurality of multipath signal segments, each of the plurality of multipath signal segments being received at different times, and further comprising:

assigning to a portion of each of the plurality of multipath signal segments a respective time of receipt.

36. (Original) The method of Claim 35, further comprising:

determining a reference time of receipt based on the respective times of receipt.

37. (Currently Amended) The method of Claim 35, further comprising:

correlating the plurality of multipath signal segments without regard to the differing times of receipt to form a summated peak magnitude;

aligning the plurality of multipath signal segments relative to the reference time of receipt to form a plurality of aligned signals;

scaling each of the multipath signal segments to form a plurality of scaled signals; and

~~third~~ summing ~~at least one of the aligned signals and~~ the scaled signals.

38. (Original) The method of Claim 30, further comprising:

determining an actual time of transmission of the first CDMA signal segment;

determining an actual received time for the first CDMA signal segment; and

repeating step (b) using an actual time of transmission of the first CDMA signal segment and the actual received time.

39. (Previously Presented) The method of Claim ~~29~~ 30, further comprising the step of generating a plurality of projection operators according to the equation:

$$(y^T(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)y)/\sigma^2$$

where y corresponds to the composite signal, H is related to an interference code matrix of the first emitter, S is related to an interference code matrix of at least a second emitter, ^{T} denotes the transpose operation, I denotes the identity matrix and σ^2 corresponds to the variance of, the magnitude of a noise portion of the composite signal.

40. (Currently Amended) A system for processing an output signal of an antenna, the output signal corresponding to a composite signal, comprising:

at least one projection filter for determining a parameter of an oblique CDMA projection of ~~an~~ the output signal of ~~an~~ the antenna, the oblique CDMA projection being attributable to an emitter having an interference code matrix and the at least one projection filter determining a parameter of the oblique CDMA projection by projecting obliquely a signal space spanned by the output signal onto a signal space spanned by the oblique CDMA projection and wherein an interference space corresponds to an interference code matrix corresponding to a second CDMA signal segment in the composite signal and the interference space is orthogonal to CDMA signal space spanned by the oblique CDMA projection.

41. (Original) The system of Claim 40, wherein the antenna includes a receiver and at least a portion of a noise portion of the output signal is generated by the receiver.

42. (Previously Presented) The system of Claim 40, further comprising a plurality of projection builders corresponding to a plurality of antennas and being in communication therewith, each of the plurality of projection builders being adapted to determine a respective oblique CDMA projection of a corresponding portion of a respective composite signal received by each of the plurality of antennas and determine the respective oblique CDMA projection of the corresponding output signal by the equation:

$$(y^T(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)y)/\sigma^2$$

where y corresponds to the output signal, H is related to an interference code matrix of the emitter, S is related to an interference code matrix of at least a second emitter, ^{T} denotes the transpose operation, I denotes the identity matrix, and σ^2 corresponds to the variance of the magnitude of a noise portion of the output signal.

43. (Previously Presented) The system of Claim 42, wherein the at least one projection filter comprises a plurality of projection filters corresponding to the plurality of antennas and further comprising a plurality of RAKE processors in communication with a corresponding one of the plurality of projection filters, wherein each of the plurality of projection filters produces a corresponding projection filter output which is received as a RAKE processor input by each of the plurality of projection filter's corresponding RAKE processor, the corresponding projection filter output of each of the plurality of projection filters being delayed relative to one another,

each of the plurality of RAKE processors being adapted to align and scale their respective inputs to produce a corresponding compensated output.

44. (Previously Presented) The system of Claim 43, wherein the corresponding compensated output of each of the plurality of RAKE processors is delivered to a second projection filter in communication therewith for determining a refined projection filter of each of the compensated outputs.

45. (Previously Presented) The system of Claim 40, wherein the oblique CDMA projection comprises a plurality of multipath signal segments and the projection filter outputs a correlation function having a plurality of peaks corresponding to the plurality of multipath signal segments, and further comprising:

a threshold detector, in communication with the projection operator, for generating timing information defining a temporal relationship among the plurality of peaks.

46. (Original) The system of Claim 45, wherein the system comprises a plurality of antennas in communication with a corresponding threshold detector and further comprising:

a timing reconciliation device for determining a reference time based on timing information received from each of the threshold detectors.

47. (Previously Presented) The system of Claim 46, further comprising:

one or more RAKE processors, in communication with the projection filters and the timing reconciliation device, for aligning the plurality of multipath signal segments in at least one of time and phase based on the magnitudes of the plurality of multipath signal segments and the reference time to form an aligned first signal.

48. (Currently Amended) A system for processing an output signal of an antenna, the output signal corresponding to a composite signal and being decomposable into a first oblique projection attributable to a first source having an interference code matrix, comprising:

~~projection~~ projecting means for obliquely projecting a signal space spanned by ~~an~~ the output signal onto a first signal space spanned by the first CDMA oblique projection to

determine a parameter of the first oblique projection wherein an interference space corresponds to an interference code matrix affiliated with a second CDMA signal segment in the composite signal and the interference space is orthogonal to first signal space spanned by the first signal space.

49. (Original) The system of Claim 48, wherein the composite signal is decomposable into the second signal segment, the second signal segment being attributable to a second source other than the first source and wherein the signal space is obliquely projected onto the first signal space along a second signal space corresponding to the second signal segment.

50. (Original) The system of Claim 49, wherein the system includes:

a) a plurality of antennas, each of which receives at least a portion of the composite signal, and

b) a plurality of projecting means corresponding with the plurality of antennas and being in communication therewith, each of the plurality of projecting means being adapted to determine by oblique projection the first oblique projection of the respective output signal received by the corresponding antenna.

51. (Original) The system of Claim 50, including a plurality of RAKE processors corresponding with the plurality of projecting means, wherein each of the plurality of projecting means produces a respective projecting means output which is received as a RAKE processor input by each of the plurality of projecting means' corresponding RAKE processor, the respective output of each of the plurality of projecting means being delayed relative to one another, each of the plurality of RAKE processors being adapted to align and scale its respective input to produce a compensated output.

52. (Original) The system of Claim 51, wherein the compensated output of each of the plurality of RAKE processors is delivered to a summing correlator.

53. (Original) The system of Claim 48, further including a RAKE processor having a RAKE input, wherein the projecting means produces a projecting means output which is coupled to the RAKE input.

54. (Original) The system of Claim 48, wherein the first oblique projection comprises a plurality of multipath signal segments and the projecting means outputs a correlation function having a plurality of peaks corresponding to the plurality of multipath signal segments, and further comprising:

threshold detecting means, in communication with the projecting means, for generating timing information defining a temporal relationship among the plurality of peaks.

55. (Original) The system of Claim 54, wherein the system comprises a plurality of projecting means and a plurality of antennas in communication with a corresponding threshold detecting means and further comprising:

timing reconciliation means for determining a reference time based on timing information received from each of the threshold detecting means.

56. (Original) The system of Claim 55, further comprising:

a RAKE processing means, in communication with each of the projecting means and the timing reconciliation means, for aligning the plurality of multipath signal segments in at least one of time and phase as a function of at least one of the magnitudes of the plurality of multipath signal segments, the reference time, and the phase, the phased RAKE means outputting an aligned first signal.

57. (Original) The system of Claim 56, further comprising:

a plurality of RAKE processing means, each RAKE processing means being in communication with a corresponding one of the plurality of antennas and producing a corresponding aligned first signal; and

a demodulating means, in communication with the plurality of RAKE processing means, for demodulating at least a portion of each corresponding aligned first signal, the at least a portion of each corresponding aligned first signal defining a respective aligned first space, the

demodulating means determining the respective corresponding aligned first signals by obliquely projecting a respective signal space defined by a corresponding aligned first signal onto the respective aligned first space.

58. (Currently Amended) A method for processing a composite CDMA signal, comprising:

(a) estimating at least one of a time offset, a code offset, and a Doppler offset corresponding to at least one CDMA signal segment;

(b) determining an interference code corresponding to the at least one CDMA signal segment ~~using the at least one of the time offset, code offset and Doppler offset~~ <u>in response to (a)</u>; and

(c) building a space S using the interference code.

59. (Original) The method of claim 58, wherein steps (a) and (b) are repeated for at least one other signal segment and in step (c) a plurality of interference codes are used to build S.

60. (Currently Amended) The method of claim 58 further comprising:

(d) estimating at least one of a time offset, a code offset, and a Doppler offset corresponding to a second CDMA signal segment;

(e) determining a second interference code corresponding to the second CDMA a signal segment ~~using the at least one of the time offset, code offset and Doppler offset of step (d)~~ <u>in response to (d)</u>;

(f) building a space H using the second interference code; and

(g) determining a projection operator using the S and H spaces.

61. (Original) The method of Claim 60, further comprising:

(h) determining a correlation function using the projection operator.

62. (Previously Presented) A system for processing a coded signal, comprising:

an input for receiving a coded signal, the coded signal being decomposable into a first signal segment and at least a second signal segment, the first signal segment being

attributable to a first emitter, and the at least a second signal segment being attributable to at least a second emitter different from the first emitter; and

at least a first correlator operable to output at least a first correlation function corresponding to the first signal segment of the coded signal, the first correlator being operable to project a coded signal space spanned by the coded signal onto a first signal space spanned by the first signal segment to determine a parameter associated with the first signal segment, wherein the first signal space is orthogonal to an interference space corresponding to at least one interference code matrix associated with the at least a second signal segment.

63. (Previously Presented) The system of Claim 62, wherein the at least a first correlator is operable to obliquely project the coded signal space onto the first signal space.

64. (Previously Presented) The system of Claim 62, wherein the first correlator comprises:

at least a first projection builder operable to output a first set of projection operators.

65. (Previously Presented) The system of Claim 64, wherein the at least a first projection builder each projection operator in the first set using the following mathematical expression:

$$(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)$$

where H is related to a first interference code matrix of the first emitter, S is related to the at least one interference code matrix of the at least a second emitter, ^{T} denotes the transpose operation, and I denotes the identity matrix.

66. (Previously Presented) The system of Claim 64, wherein the at least a first correlator comprises:

a user code generator operable to output for the first emitter a set of trial transmit times and candidate symbols corresponding to the first signal segment and, for each pairing of trial transmit times and candidate symbols in the set, generate a candidate user code for the first emitter and wherein the at least a first projection builder uses the candidate user codes to determine the first set of projection operators.

67. (Previously Presented) The system of Claim 66, wherein the at least a first correlator comprises:

a bank of projection filters, each projection filter in the bank of projection filters corresponding to each projection operator in the first set of projection operators, operable to output the at least a first correlation function.

68. (Previously Presented) The system of Claim 67, wherein each of the projection filters is operable to output the at least a first correlation function attributable to the first emitter from the corresponding projection operator in the first set of projection operators while simultaneously nulling out interference attributable to emitters different from the first emitter.

69. (Previously Presented) The system of Claim 67, further comprising:

a threshold detector operable to determine temporal locations of selected peaks in the at least a first correlation function.

70. (Previously Presented) The system of Claim 69, further comprising:

a timing reconciliation device operable to determine a reference time based on the temporal locations of the selected peaks.

71. (Currently Amended) The system of Claim 70, wherein the at least a first correlation function comprises a plurality of correlation functions and further comprising:

based on the reference time, a RAKE processor operable to ~~scale and align in time and phase~~ align in phase and time and then scale each of the plurality of correlation functions to form a plurality of aligned and scaled correlation functions and sum the plurality of aligned and scaled correlation functions to form a RAKE output.

72. (Previously Presented) The system of Claim 71, further comprising:

a demodulator operable to determine, based on the RAKE output, an actual transmit time for the first signal segment.

73. (Previously Presented) The system of Claim 72, wherein the demodulator comprises:

a second user code generator operable to output for the first emitter a second set of trial transmit times and candidate symbols corresponding to the first signal segment and, for each pairing of trial transmit times and candidate symbols in the set, generate at least a second candidate user code for the first emitter;

a second projection builder to determine, for the at least a second candidate user code and based on the RAKE output, a second set of projection operators; and

a second bank of projection filters, each filter being associated with a projection operator in the second set of projection operators, operable to output at least a second correlation function.

74. (Previously Presented) The system of Claim 73, further comprising:

a second threshold detector operable to determine an actual transmit time and symbol based on the at least a second correlation function.

75. (Previously Presented) The system of Claim 74, further comprising:

a decoder operable to despread the RAKE output using the actual transmit time and symbol.

76. (Previously Presented) The system of Claim 62, further comprising:

at least one antenna operable to receive the coded signal and

at least one output operable to output first and second channel signals corresponding to the coded signal.

77. (Previously Presented) The system of Claim 76, wherein the first channel signal corresponds to an in-phase portion of the coded signal and the second channel signal corresponds to a quadrature portion of the coded signal.

78. (Previously Presented) A method for processing a coded signal, comprising:

providing a coded signal, the coded signal comprising a first signal segment and at least a second signal segment; and

projecting a coded signal space spanned by the coded signal onto a first signal space spanned by the first signal segment to determine a parameter associated with the first signal segment, wherein the first signal space is orthogonal to an interference space corresponding to at least one interference code matrix associated with the at least a second signal segment.

79. (Previously Presented) The method of Claim 78, wherein in the projecting step the coded signal space is obliquely projected onto the first signal space.

80. (Previously Presented) The method of claim 78, wherein the output of the projecting step is at least a first correlation function corresponding to the first signal segment.

81. (Previously Presented) The method of Claim 80, further comprising:

generating a first set of projection operators associated with the first signal segment.

82. (Previously Presented) The method of Claim 81, wherein the generating step is performed using the following mathematical expression:

$$(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)$$

where H is related to a first interference code matrix of the first emitter, S is related to the at least one interference code matrix of the at least a second emitter, ^{T} denotes the transpose operation, and I denotes the identity matrix.

83. (Previously Presented) The method of Claim 81, further comprising:

outputting for the first emitter a set of trial transmit times and candidate symbols corresponding to the first signal segment; and

for each pairing of trial transmit times and candidate symbols in the set, generating a candidate user code for the first emitter and wherein the candidate user codes are used to generate the first set of projection operators.

84. (Previously Presented) The method of Claim 83, further comprising:

detecting temporal locations of selected peaks in the at least a first correlation function.

85. (Previously Presented) The method of Claim 84, further comprising:

determining a reference time based on the temporal locations of the selected peaks.

86. (Currently Amended) The method of Claim 85, wherein the at least a first correlation function comprises a plurality of correlation functions and further comprising:

based on the reference time, ~~scaling and aligning in time and phase~~ aligning in phase and time and then scaling each of the plurality of correlation functions to form a plurality of aligned and scaled correlation hnctions; and

summing the plurality of aligned and scaled correlation functions to form a RAKE output.

87. (Previously Presented) The method of Claim 86, further comprising:

determining, based on the RAKE output, an actual transmit time for the first signal segment.

88. (Previously Presented) The method of Claim 87, further comprising:

outputting for the first emitter a second set of trial transmit times and candidate symbols corresponding to the first signal segment; and

for each pairing of trial transmit times and candidate symbols in the set, generating at least a second candidate user code for the first emitter.

89. (Previously Presented) The method of Claim 88, further comprising:

determining, for the at least a second candidate user code and based on the RAKE output, a second set of projection operators; and

based on the second set of projection operators, outputting at least a second correlation function.

90. (Previously Presented) The method of Claim 89, further comprising:

determining an actual transmit time and symbol based on the at least a second correlation function.

91. (Previously Presented) The method of Claim 90, further comprising:

despreading the RAKE output using the actual transmit time and symbol.

92. (Previously Presented) The method of Claim 78, further comprising:

converting the coded signal into first and second channel signals.

93. (Previously Presented) The method of Claim 92, wherein the first channel signal corresponds to an in-phase portion of the coded signal and the second channel signal corresponds to a quadrature portion of the coded signal.

94. (Previously Presented) A system for processing a coded signal, comprising:

an input for a coded signal, the coded signal being decomposable into a first signal segment and at least a second signal segment; and

at least a first projection filter operable to project a coded signal space spanned by the coded signal onto a first signal space spanned by the first signal segment to determine a parameter of the first signal segment, wherein the first signal space is orthogonal to an interference space corresponding to at least one interference code matrix associated with the at least a second signal segment.

95. (Previously Presented) The system of Claim 94, wherein the at least a first projection filter is operable to project obliquely the coded signal space onto the first signal space, the first signal segment being attributable to a first emitter having a first interference code matrix.

96. (Previously Presented) The system of Claim 95, wherein the at least a first projection filter outputs at least a first correlation function corresponding to the first signal segment.

97. (Previously Presented) The system of Claim 96, further comprising:
at least a first projection builder operable to output a first set of projection operators.

98. (Previously Presented) The system of Claim 97, wherein the at least a first projection builder generates each projection operator in the first set using the following mathematical expression:

$$(I-S(S^TS)^{-1}S^T)H(H^T(I-S(S^TS)^{-1}S^T)H)^{-1}H^T(I-S(S^TS)^{-1}S^T)$$

where H is related to the first interference code matrix of the first emitter, S is related to the at least one interference code matrix of at least a second emitter different from the first emitter and associated with the at least a second signal segment, ^{T} denotes the transpose operation, and I denotes the identity matrix.

99. (Previously Presented) The system of Claim 97, further comprising:

a user code generator operable to output for the first emitter a set of trial transmit times and candidate symbols corresponding to the first signal segment and, for each pairing of trial transmit times and candidate symbols in the set, generate a candidate user code for the first emitter and wherein the at least a first projection builder uses the candidate user codes to determine the first set of projection operators.

100. (Previously Presented) The system of Claim 99, further comprising:

a bank of projection filters, each projection filter in the bank of projection filters corresponding to each projection operator in the first set of projection operators, operable to output the at least a first correlation function.

101. (Previously Presented) The system of Claim 100, wherein each of the projection filters is operable to output the at least a first correlation function attributable to the first emitter from the corresponding projection operator in the first set of projection operators while simultaneously nulling out interference attributable to emitters different from the first emitter.

102. (Previously Presented) The system of Claim 101, further comprising:

a threshold detector operable to determine temporal locations of selected peaks in the at least a first correlation function.

103. (Previously Presented) The system of Claim 102, further comprising:

a timing reconciliation device operable to determine a reference time based on the temporal locations of the selected peaks.

104. (Currently Amended) The system of Claim 103, wherein the at least a first correlation function comprises a plurality of correlation functions and further comprising:

based on the reference time, a RAKE processor operable to ~~scale and align in time and phase~~ align in phase and time and then scale each of the plurality of correlation functions to form a plurality of aligned and scaled correlation functions and sum the plurality of aligned and scaled correlation functions to form a RAKE output.

105. (Previously Presented) The system of Claim 104, further comprising:

a demodulator operable to determine, based on the RAKE output, an actual transmit time for the first signal segment.

106. (Currently Amended) The system of Claim 105, wherein the demodulator comprises:

a second user code generator operable to output for the first emitter a second set of trial transmit times and candidate symbols corresponding to the first signal segment and, for each pairing of trial transmit times and candidate symbols in the set, generate at least a second candidate user code for the first emitter[[.]];

a second projection builder to determine, for the at least a second candidate user code and based on the RAKE output, a second set of projection operators; and

a second bank of projection filters, each filter being associated with a projection operator in the second set of projection operators, operable to output at least a second correlation function.

107. (Previously Presented) The system of Claim 106, further comprising:

a second threshold detector operable to determine an actual transmit time and symbol based on the at least a second correlation function.

108. (Previously Presented) The system of Claim 107, further comprising:

a decoder operable to despread the RAKE output using the actual transmit time and symbol.

109. (Previously Presented) The system of Claim 94, further comprising:

at least one antenna operable to receive the coded signal; and

at least one output operable to output first and second channel signals corresponding to the coded signal.

110. (Previously Presented) The system of Claim 109, wherein the first channel signal corresponds to an in-phase portion of the coded signal and the second channel signal corresponds to a quadrature portion of the coded signal.

111. (Previously Presented) The system of Claim 94, wherein the at least a first projection filter is a plurality of projection filters operable to project obliquely a respective coded signal space corresponding to a respective coded signal onto a respective first signal space spanned by a respective first signal segment of the respective coded signal.